AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method of queuing InfiniBand receive traffic, comprising:

maintaining a single contiguous memory structure for queuing InfiniBand traffic received via multiple virtual lanes and multiple queue pairs;

queuing one or more InfiniBand Send commands in a single queue, wherein each said Send command comprises an encapsulated communication;

queuing a set of InfiniBand RDMA Read descriptors in said single queue;

selecting an entry in said single queue, wherein said entry comprises a Send command or a set of said RDMA Read descriptors;

if said selected entry is a set of said RDMA Read descriptors:

issuing a set of RDMA Read requests to retrieve portions of a communication described by said RDMA Read descriptors; and

as RDMA Read responses are received in response to said RDMA Read requests, assembling said described communication in said single queue; and

forwarding a communication associated with said selected entry, for transmission on an external communication link, wherein said communication is one of:

said encapsulated communication if said selected entry is a Send command; and

said described communication if said selected entry is a set of

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22   RDMA Read descriptors.

1   2.   (Cancelled)

1   3.   (Currently Amended) The method of claim 2̶3̶, wherein said single
2   queue comprises one or more linked lists of memory buffers within said single
3   memory structure.

1   4.   (Currently Amended) The method of claim 1, further comprising:
2   maintaining an assembly area of said single queue, in which said described
3   communication is assembled; and
4   maintaining a queuing area of said single queue, in which said one or more
5   Send commands and said set of RDMA Read descriptors are queued.

1   5.   (Original) The method of claim 4, wherein said RDMA Read
2   responses are placed directly into said assembly area upon receipt.

1   6.   (Currently Amended) The method of claim 4, further comprising, if
2   said selected entry is a set of RDMA Read descriptors:
3   appending space to said assembly area of said single queue based on an
4   expected size of said described communication.

1   7.   (Currently Amended) The method of claim 4, further comprising:
2   maintaining a first head pointer configured to identify a head of said
3   assembly area of said single queue;
4   maintaining a first tail pointer configured to identify a tail of said assembly
5   area of said single queue;
6   maintaining a second head pointer configured to identify a head of said

7   queuing area of said <u>single</u> queue;

8   maintaining a second tail pointer configured to identify a tail of said

9   queuing area of said <u>single</u> queue; and

10   maintaining a next entry pointer configured to identify a next entry in said

11   <u>single</u> queue to be processed after said forwarding.

1   8.   (Original) The method of claim 7, wherein said first head pointer is

2   further configured to identify a beginning of said communication.

1   9.   (Currently Amended) The method of claim 7, wherein said second

2   tail pointer is configured to identify where in said <u>single</u> queue a next Send

3   command or set of RDMA Read descriptors is to be queued.

1   10.   (Original) The method of claim 1, further comprising:

2   maintaining a set of pointers configured to identify a beginning and an end

3   of said communication.

1   11.   (Currently Amended) The method of claim 10, wherein said set of

2   pointers includes a head pointer configured to identify a head of said <u>single</u> queue.

1   12.   (Original) The method of claim 1, wherein said assembling

2   comprises dropping an RDMA Read response received out of order.

1   13.   (Currently Amended) A computer readable medium storing

2   instructions that, when executed by a computer, cause the computer to perform a

3   method of queuing InfiniBand receive traffic, the method comprising:

4   <u>maintaining a single contiguous memory structure for queuing InfiniBand</u>

5   <u>traffic received via multiple virtual lanes and multiple queue pairs;</u>

6   queuing one or more InfiniBand Send commands in a <u>single</u> queue,

7   wherein each said Send command comprises an encapsulated communication;

8   queuing a set of InfiniBand RDMA Read descriptors in said <u>single</u> queue;

9   selecting an entry in said <u>single</u> queue, wherein said entry comprises a

10   Send command or a set of said RDMA Read descriptors;

11   if said selected entry is a set of said RDMA Read descriptors:

12   issuing a set of RDMA Read requests to retrieve portions of a

13   communication described by said RDMA Read descriptors; and

14   as RDMA Read responses are received in response to said RDMA

15   Read requests, assembling said described communication in said <u>single</u>

16   queue; and

17   forwarding a communication associated with said selected entry, for

18   transmission on an external communication link, wherein said communication is

19   one of:

20   said encapsulated communication if said selected entry is a Send

21   command; and

22   said described communication if said selected entry is a set of

23   RDMA Read descriptors.

1   14.   (Currently Amended) The computer readable medium of claim 13,

2   wherein the method further comprises:

3   maintaining an assembly area of said <u>single</u> queue, in which said described

4   communication is assembled; and

5   maintaining a queuing area of said <u>single</u> queue, in which said one or more

6   Send commands and said set of RDMA Read descriptors are queued.

1   15.   (Currently Amended) The computer readable medium of claim 14,

2   wherein the method further comprises, if said selected entry is one of said RDMA

3   Read commands:

4   appending space to said assembly area of said <u>single</u> queue based on an

5   expected size of said described communication.

1   16.   (Currently Amended) The computer readable medium of claim 15,

2   wherein the method further comprises:

3   maintaining a first head pointer configured to identify a head of said

4   assembly area of said<u> single</u> queue;

5   maintaining a first tail pointer configured to identify a tail of said assembly

6   area of said <u>single</u> queue;

7   maintaining a second head pointer configured to identify a head of said

8   queuing area of said <u>single</u> queue;

9   maintaining a second tail pointer configured to identify a tail of said

10   queuing area of said <u>single</u> queue; and

11   maintaining a next entry pointer configured to identify a next entry in said

12 <u>single</u> queue to be processed after said forwarding.

1   17.   (Currently Amended) A method of queuing multiple types of

2   traffic in a <u>single </u>receive queue of a communication interface, the method

3   comprising:

4   <u>maintaining a single contiguous memory structure for queuing InfiniBand</u>

5   <u>traffic received via multiple communication streams;</u>

6   queuing a first entry comprising a first communication forwarded to the

7   communication interface by a host;

8   queuing a second entry comprising a set of descriptors configured to

9 describe a second communication stored on the host;

10   processing said first entry, wherein processing said first entry comprises:

11   determining whether said first communication is complete; and

12   forwarding said first communication to a communication module

13   for transmission; and

14   processing said second entry, wherein processing said second entry

15 comprises:

16   issuing requests to obtain portions of said second communication

17   described by said descriptors;

18   assembling said second communication in said <u>single</u> queue; and

19   forwarding said second communication to the communication

20   module for transmission.

1 18. (Original) The method of claim 17, wherein processing said second

2 entry further comprises:

3 determining whether said second communication has been fully

4 assembled.

1 19. (Original) The method of claim 17, further comprising:

2 maintaining a queuing area for queuing Send commands; and

3 maintaining an assembly area for assembling said second communication

4 from said portions of said second communication.

1 20. (Original) The method of claim 19, wherein processing said second

2 entry further comprises:

3 placing said portions of said second communication directly into said

4 assembly area upon receipt.

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1   21.   (Original) The method of claim 17, further comprising:
2   forwarding a previous communication to the communication module; and
3   selecting whichever of said first entry and said second entry has been
4   queued for the longest time.

1   22.   (Currently Amended) The method of claim 21, wherein said
2   selecting comprises advancing a next entry pointer to the next entry in the single
3   receive queue.

1   23.   (Original) The method of claim 22, wherein said selecting further
2   comprises reading a portion of a payload of said next entry to determine a traffic
3   type of said next entry.

1   24.   (Currently Amended) The method of claim 17, wherein the single
2   receive queue comprises a set of linked memory buffers within said a single
3   contiguous memory structure configured as queues for one or more InfiniBand
4   queue pairs.

1   25.   (Currently Amended) The method of claim 24, wherein processing
2   said second entry further comprises:
3   appending one or more free memory buffers of the single contiguous
4   memory structure to the single receive queue;
5   wherein said assembling comprises assembling said second
6   communication in said one or more memory buffers.

1   26.   (Currently Amended) A computer readable medium storing
2   instructions that, when executed by a computer, cause the computer to perform a
3   method of queuing multiple types of traffic in a single receive queue of a

4   communication interface, the method comprising:

5   <u>maintaining a single contiguous memory structure for queuing InfiniBand</u>

6   <u>traffic received via multiple communication streams;</u>

7   queuing a first entry comprising a first communication forwarded to the

8   communication interface by a host;

9   queuing a second entry comprising a set of descriptors configured to

10   describe a second communication stored on the host;

11   processing said first entry, wherein processing said first entry comprises:

12   determining whether said first communication is complete; and

13   forwarding said first communication to a communication module

14   for transmission; and

15   processing said second entry, wherein processing said second entry

16   comprises:

17   issuing requests to obtain portions of said second communication

18   described by said descriptors;

19   assembling said second communication in said <u>single</u> queue; and

20   forwarding said second communication to the communication

21   module for transmission.

1   27.   (Original) The computer readable medium of claim 26, wherein the

2   method further comprises:

3   maintaining a queuing area for queuing Send commands; and

4   maintaining an assembly area for assembling said second communication

5   from said portions of said second communication.

1   28.   (Original) The computer readable medium of claim 27, wherein

2   processing said second entry further comprises:

3   placing said portions of said second communication directly into said

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4   assembly area upon receipt.

1   29.   (Currently Amended) An apparatus for queuing multiple types of
2   receive traffic in a communication interface, comprising:
3   a single queue for queuing multiple types of receive traffic commands,
4   wherein each said command is associated with a communication to be transmitted
5   from the communication interface;
6   a single contiguous memory structure shared by multiple communication
7   streams;
8   a head pointer configured to identify a head of said single queue;
9   a tail pointer configured to identify a tail of said single queue, wherein said
10   traffic commands are enqueued at said tail; and
11   a next entry pointer configured to identify a next entry in said single queue
12   to be processed.

1   30.   (Currently Amended) The apparatus of claim 29, wherein said
2   single queue comprises an assembly area for assembling a communication
3   associated with a first type of receive traffic command.

1   31.   (Currently Amended) The apparatus of claim 30, wherein said
2   single queue further comprises a queuing area for queuing a second type of
3   receive traffic command.

1   32.   (Original) The apparatus of claim 31, wherein said assembly area
2   and said queuing area are each delimited by a head pointer and a tail pointer.

1   33.   (Original) The apparatus of claim 30, wherein said first type of
2   receive traffic command is an InfiniBand Send command comprising a set of

3   RDMA read descriptors configured to identify the communication associated with

4   said first type of receive traffic command.

1   34.   (Original) The apparatus of claim 33, wherein a second type of

2   receive traffic command is an InfiniBand Send command configured to

3   encapsulate the communication associated with said second type of receive traffic

4   command.

1   35.   (Original) The apparatus of claim 30, wherein:

2   said first type of receive traffic command comprises a set of descriptors,

3   wherein each said descriptor is configured to describe a portion of the

4   communication associated with said command; and

5   the apparatus is configured to issue read requests to retrieve the portions of

6   the communication described by the set of descriptors and assemble said portions

7   in said assembly area.

1   36.   (Currently Amended) The apparatus of claim 29, further

2   comprising:

3   a transmit module configured to transmit the communications associated

4   with said receive traffic commands;

5   wherein each communication associated with a receive traffic command is

6   forwarded from said single queue to said transmit module after the

7   communication is determined to be complete.

1   37.   (Currently Amended) The apparatus of claim 36, wherein a

2   communication is forwarded from said queue to said transmit module by passing

3   to the transmit module a set of pointers delimiting the communication within said

4   single queue rather than passing the communication.

1   38.   (Currently Amended) The apparatus of claim 29, wherein said
2   single queue comprises one or more linked lists of buffers within a single
3   contiguous memory structure configured to queue receive traffic for multiple
4   communication connections.

1   39.   (Currently Amended) A method of maintaining ordering of
2   transmission of outbound communications from an InfiniBand channel adapter,
3   the method comprising:
4   receiving on a first queue pair a first InfiniBand packet payload comprising
5   a set of RDMA (Remote Direct Memory Access) Read descriptors describing a
6   first communication;
7   after receiving said first InfiniBand packet, receiving on the first queue
8   pair a second InfiniBand packet payload comprising a portion of a second
9   communication;
10   after receiving said second InfiniBand packet, processing said first
11   InfiniBand packet payload by:
12   dispatching RDMA Read requests corresponding to said set of
13   RDMA Read descriptors;
14   receiving responses to said RDMA Read requests, said responses
15   comprising portions of the first communication;
16   assembling the first communication; and
17   transmitting the first communication from the channel adapter; and
18   only after said processing said first InfiniBand packet, processing said
19   second InfiniBand packet; and
20   maintaining a single contiguous memory structure for queuing InfiniBand
21   traffic received via multiple communication streams.

1   40.   (Original) The method of claim 39, wherein said processing said

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2   second InfiniBand packet comprises transmitting the second communication from

3   the channel adapter.

1   41.   (Currently Amended) The method of claim 39, wherein:

2   said receiving a first InfiniBand packet payload comprises queuing said

3   first InfiniBand packet payload in a first portion of a <u>single</u> queue associated with

4   the first queue pair; and

5   said receiving a second InfiniBand packet payload comprises queuing said

6   second InfiniBand packet payload in the first portion of the <u>single</u> queue.

1   42.   (Currently Amended) The method of claim 41, wherein said

2   assembling comprises:

3   assembling said portions of the first communication in a second portion of

4   the <u>single</u> queue.